An appraisal of « cooperative banks » versus « plc banks » efficiency : a focus on the French situation and a European perspective

This article was presented at the International Workshop on Cooperative Banking – Helsinki Banking School of Economics – 6-8 december 2007 – Helsinki - Finland

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Introduction

Can "cooperative banks" compete efficiently with "public limited companies" banks[3] and are they able to survive and to grow? This question has already been discussed, particularly in American and English literature in the late 1990's. Most of these studies, relying on the Agency Theory approach, conclude that cooperative banks are inefficient and, as a result, are doomed to disappear. In Europe, however, the situation seems to be quite different. After briefly explaining why and how such banks have been regarded as inefficient (1), we will show that those analyses cannot be applied to the French banking industry. Indeed, in the mid-1990's, French cooperative banks chose to evolve and went through a huge amount of restructuring; they are now included in important banking groups. We will use a non-parametric method to see if, regarding the same criteria as those frequently used for measuring the efficiency of plc banks, French cooperative banks are able to stand comparison with French plc banks, and with a sample of European plc banks (2). Then, widening the analysis, and implementing a factor analysis relying on the same criteria, we will show that the situation of cooperative banks in Europe is very different, and we will try to point out some common features and differences (3).

1. The summary of the debate : would cooperative banks be inefficient because of an unsuitable status, in face of a changing environment?

A lot of studies[4] have proved that organizations can be characterized by different ownership and control structures, and therefore by different governance mechanisms, which have an impact on their efficiency. According to the Agency Theory and the Neo-institutional Theory, the efficiency of an organization depends on its ability to reduce *transaction costs* and *agency costs* (WILLIAMSON, 1983), and therefore, only the most efficient organizations will be able to survive. Some American authors have developed a thesis relying on this theoretical approach (the Agency Theory), to suggest that only the model of the Anglo-American public listed company, owned by a lot of shareholders, is able to compete and grow ; with the result that this model of corporate governance will soon spread all over the world (HANSMMAN & KRAAKMAN, 2001). In line with FAMA & JENSEN (1983), they consider that the only efficient organization is the one which grants control to the "residual claimant", that is to say, the shareholder. Indeed, the shareholder has a direct interest in the maximisation of the value created by the firm ; therefore, he has a right to control the manager, and to check that the management decisions taken by the latter are the best choices for the firm and for its own interest. The efficiency of the classical plc firm will depend on its

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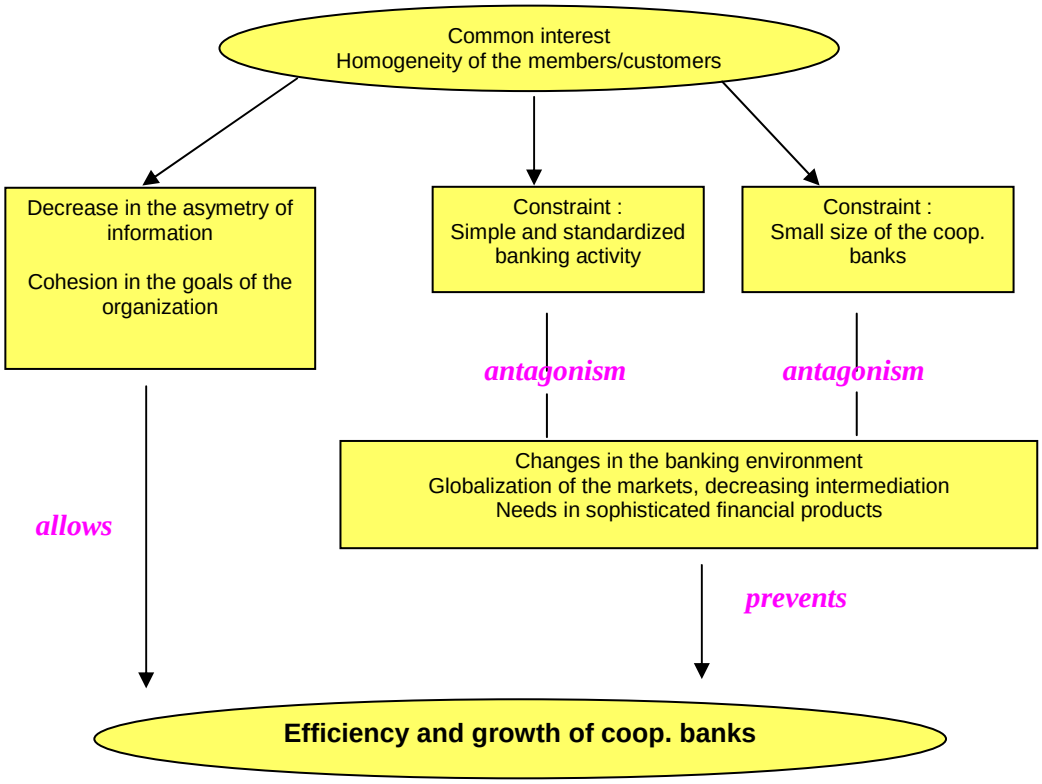
[3] For the following developments, « plc banks » will also be called « commercial banks », as opposed to « cooperative banks » or « cooperative banking networks ».
[4] For example, FAMA & JENSEN (1983).

ability to solve *agency costs*, especially the cost of "control of the managers", and the potential interest conflict between shareholders and creditors, which becomes possible with deregulated markets, and with a "market discipline" role conferred to the financial market. By contrast, most of these authors think that cooperative banks suffer from a lack of efficiency, which explains their weak performance. The two diagrams below summarize their analyses.

Scheme 1

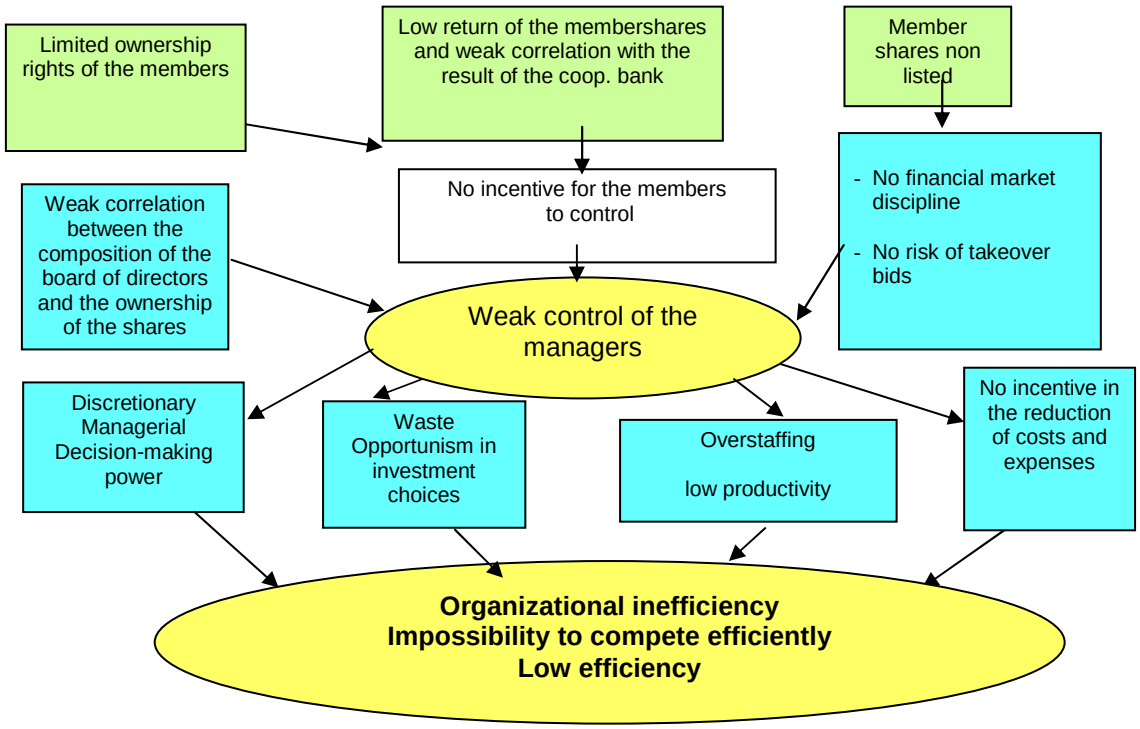
The common interest of the coop. banks customers : advantages and constraints



In theory, cooperative banks benefit from a comparative advantage in reducing the asymmetry of information (diagram 1) : thanks to the homogeneity of the customers, to the twin identity of the members (simultaneously customers and owners of the capital), and thanks to a strong relationship with customers, the individual credit risk coming from the "creditor-debtor" relationship could be less than in commercial banks (HANSMANN 1996 ; HART & MOORE 1990 ; BERGER & MESTER, 1997). Nevertheless, the impossibility for a cooperative bank to diversify the whole credit risk because of its small size, to benefit from economies of scale or scope, and the difficulty in raising capital, would explain why they cannot survive in a changing environment (AKELLA & GREENBAUM, 1988 ; MESTER, 1993 ; EMMONS & SCHMID, 2000).

Moreover, the internal and external mechanisms of governance could be inefficient (diagram n° 2) : the members would not be encouraged to control the managers, because of diffuse ownership rights and because of a weak correlation between the net profit of the cooperative and the return of the membershare (MAYERS & SMITH, 1994). The financial "market discipline" would not be able to play its role, since the cooperative bank is not listed (therefore, the decreasing price of the share cannot sanction "bad managers" and the threat of a takeover bid cannot push the cooperative towards efficiency). Consequently, personal costs would stand at a high level and productivity would be low (AKELLA & GREENBAUM, 1988) ; more generally, cost-cutting incentives would be insufficient, and so would financial efficiency (return on equity).

Diagram 2 : the inefficiency of governance mechanisms in coop. banks ?



2. A focus on the French situation and a statistical approach to assess efficiency

In light of the importance of cooperative banks in the European banking industry, and especially in France, we hardly can share the opinion of the authors mentioned above. Moreover, other control mechanisms and other efficiency incentives exist in cooperative banks (ORY, JAEGER & GURTNER, 2006 a). We will first illustrate our thesis with a description of the changes experienced by French cooperative banks over the last ten years[5] and then, we will compare their efficiency with other French or European plc banks, to find out whether the conclusions mentioned above can be confirmed.

2.1 The changes experienced by French cooperative banks prove their ability to cope with a changing environment

The first argument of the American authors (the small size and the concentration of risks because of similar customers) does not stand in view of the organizational structure adopted by French cooperative banks : they are actually [currently?] structured in networks[6] ; each of them including a local, a regional and a national level. If the decision on credit is taken at the local level, the prudential and the internal risk management is implemented at an aggregate level (which is the Caisse Nationale, the head of the network) ; and so are handled the diversification of customers and the cash management of the cooperative banks of the networks..

[5] For more details, confer to ORY, GURTNER & JAEGER (2006 b)

[6] For the time being, there are four cooperative banking networks : Credit Agricole, Credit Mutuel, Caisse d'Epargne (since 1999) and Banque Populaire (the Credit Cooperative network is now part of the Banque Populaire Group)

The second argument (that it is impossible to offer a large scale of financial services and products) is not more appropriate; neither is the third one (difficulties in raising capital). Indeed, French cooperative banks have experienced major external concentration and restructuring operations since the mid-1990's, taking control of or buying out market plc banks, or else creating joint stocks subsidiaries. Every cooperative banking network belongs to a cooperative banking group (cf diagram in appendix 1), with a financial vehicle listed on the market for some of them, able to raise capital by issuing stocks in case of need (this vehicle is either the head of the group, either a holding subsidiary ; cf. the organization charts in appendices 2 and 3). Each of these groups now offers a large range of financial products or services. Each of the cooperative networks has also experienced a fair amount of internal restructuring (decreasing number of local banks, mergers at the regional level), which denotes the existence of an internal discipline to reduce costs and to reach efficiency.
Let us now conduct a statistical analysis to check the validity of these arguments.

2.2 The statistical analysis : methodology and results

In order to compare the efficiency of French cooperative banks with plc banks, we have performed non parametric Wilcoxon statistical tests (? Place de "Wilcoxon"?) on different efficiency indicators. The details of the method are mentioned below.

The description of the database :

The data used in this study comes from Bankscope, a database which is computed with data provided by the banks themselves, but collected and standardized by the Fitch Rating Agency. In order to focus the analysis on the French situation and to be able to check the validity of the theoretical arguments mentioned above, data for banks have been split into different sub-groups, allowing different kinds of comparison tests :

- First, two sub-groups have been built : "French Cooperative Banks" (FCopB) and "French plc Banking Groups" (FplcBG). The data of the FCopB sub-group only includes the activity of cooperative networks (say, the "heart of the cooperatives" : retail banking and financing of small companies), excluding the activity of subsidiaries. By contrast, the data used for the FplcBG is consolidated data, and also includes the banking activity of the subsidiaries of the parent company (retail banking, investment, activity on the financial markets…).
- Then, we have considered the development of French cooperative banks into "French Cooperative Banking Groups" (FCopBG), that is to say, the cooperative networks and all the subsidiaries owned by the head of the network, or by a holding subsidiary owned by the latter. We have performed comparison tests of efficiency between these FCopBG, against the FplcBG. The idea is to point out the consequences of the restructuring of cooperative banks on their efficiency, and find out whether the "universal bank" strategy chosen by cooperative groups causes efficiency to increase (using the same indicators).
- Last, we have built a European sample of plc banks : 34 banks amongst the European Banks from the Top 100 (assets size criterion) have been retained ; considering the period observed, only 15 countries of the European Community have been observed. Some banking groups have been avoided because of a lack of data (Deutsche Post AG, for example) and some plc banks have been withdrawn from the sample since they belong to cooperative banking groups, or are the subsidiaries of other plc banking groups, and therefore are not independent (their activity is only included in the consolidated data of the group). We have performed comparison tests between these European plc Banking Groups (EplcBG) against the three sub-groups listed above: FCopB, FplcBG and FCopBG.

The list of the banks included in each sub-group is may be found in Appendix 4 .
It should be mentioned that all the data observed in each sub-group are aggregate data : that is to say, each efficiency indicator is calculated by aggregating the data of all the banks included in each sub-group, and then transformed into a single type of efficiency ratio for the sub-group considered. Finally, for each sub-group we obtain the same efficiency ratios, which can be compared with the ratios of the other sub-groups. The list and the meaning of these ratios are explained below.

The efficiency ratios observed :

The indicators observed are the ones which are usually used by plc banks to evaluate their efficiency. We have chosen to compare cooperative banks and groups and plc banks with the indicators "recognized" by financial analysts, and not to build other specific ratios (for example : social performance ratios). Four kinds of indicators have been observed : credit risk and commercial ratios, operational efficiency ratio, equity capital ratios, and financial efficiency ratios.

Credit risk and commercial ratios :

- *loan loss provisions / net interest revenues :* good performance is denoted by a low ratio, which means that the banking rates are adapted to the effective risk. By contrast, an increase of this ratio, or a high level, means that the risk is not correctly evaluated.
- *Loan loss reserves / impaired loans :* a high ratio denotes good efficiency ; it means that the amount of impaired loans is low, or that the credit risk is hedged by a high level of reserve.
- *Net interest revenues / average assets* : a high ratio denotes that the net interest margin, relatively to the average assets[7] is appropriate, and plays an important role in creating the result. In some way, it also reveals if the bank is under competition pressure, or is rather a price maker on its market. This ratio also takes into account the cost of short/long term financing for the bank.

Operational efficiency ratios :

- *Personal expenses / average assets :* this ratio helps to find out whether the human resource cost is higher in cooperative than in plc banks, as mentioned by some American authors.
- *Cost to income ratio :* a well-known indicator used by all banks, which is supposed to denote the ability of a bank to create value through its usual activity ; value which is influenced by the net operational revenues earned by the bank, and by the operational expenses. A low ratio is considered good efficiency.
- *Pre-tax operating income/average assets :* another operational efficiency ratio, which allows comparison between different countries, since it is calculated before taxes, and before taking into account the extraordinary items. A high ratio is considered good performance.

Equity capital ratios :

- *Equity / total assets :* a commonly used ratio which is considered as a solvency indicator. It also denotes the ability of the bank to find some equity resources to finance its activity : the equity essentially includes stocks, membershares, and general reserve. A high ratio denotes good efficiency.

[7] the average between the assets at the end and the beginning of the year.

- *Subordinated (subordinate?) debt/capital funds :* the prudential regulation recognizes the subordinated debt as capital funds, under maturity and reimbursement conditions. This ratio is interesting to find out if all kinds of banks use this option to raise capital funds, or if cooperative banks do not need it, especially because of the importance of reserve, or the ability to issue membershares (whose return is lower than the return of the subordinated bonds).

Financial efficiency ratios :

- *Return on average equity (ROE) :* a commonly used ratio, built as the net result divided by the equity. A high ratio denotes good financial performance.
- *Return on average assets :* net result divided by average assets. A high ratio is a sign of good performance.

Description of the Wilcoxon test :

The Wilcoxon test is a non parametric statistical test, built on the ranks of the differences of a variable, observed simultaneously in two paired samples.

The available ratios cover the 1994-2004 period (1997-2004 for some of them). For each year, the realization of each of the ratio listed above is available, for each of the four sub-groups of banks (FcopB, FplcBG, FcopBG, EplcBG). As the test is performed for one sub-group against another one, during the same period, we can consider we are working on paired samples. The Wilcoxon Test is then performed by using the rank of the differences between each sample, for each of the efficiency ratio considered. The Wilcoxon statistics obtained (W^+) is then compared with a critical value, published by Wilcoxon, and makes it possible to accept the (H0) hypothesis of "equality of performance", or to dismiss this hypothesis and to decide on a higher performance ratio in one of the two samples considered (H1). The detailed method is explained in Appendix 5 for one of the efficiency ratios.

The results of the tests :

The results of the Wilcoxon tests are summarized in tables 1 and 2 below. Three main conclusions can be drawn from these tests :

A higher global efficiency for French cooperative banks than for French plc banking groups…

Considering the last decade, the test leads to the conclusion that the management of credit risk is at least as efficient in FcopB as it is in FplcBG, and even more so: the ratio *loan loss reserve/impaired loans* is not statistically different between these two kinds of banks, but the *loan loss provision / net interest revenue* ratio is in favour of FcopB. This result is confirmed by the fact that the ratio *Net interest revenues/average assets* is higher for FcopB than for FplcBG, which denotes that FcopB have been able to set rates which are appropriate to an effective credit risk. (?)

In view of the operational efficiency ratios, we can say that, despite a higher *personnel expenses / total assets ratio*, which could confirm part of the arguments of the American authors listed above, FcopB have been able to generate higher *operating incomes*, compared with the amount of *assets*. This point explains that the *cost to income ratio* is not statistically different for FcopB than for FplcBG. Thus, the argument of a less operational efficiency for cooperative banks can be denied.

The equity capital ratios are clearly in favour of FcopB : the *equity/total assets* ratio appears statistically higher, and the use of *subordinated debt* lower for Fcop than for FplcBG. It seems that cooperative banks do not suffer from a lack of capital funds, as mentioned in the American analysis described in part 1, and that the cooperative status, thanks to the high level

of reserve and the existence of membershares, is to be seen as an asset rather than a disadvantage in France.
Last, a more surprising conclusion is that, even if the *R.oE* ratio is in favour of FplcBG (and also much more volatile, as appears on the graph in appendix 6), the *return on average assets* ratio appears higher for FcopB. The magnitude of the capital funds of the FcopB, as mentioned above, can explain part of this conclusion.

…The evolution of French cooperative banks towards universal Cooperative Banking Groups does not seem to improve the efficiency, but still allows some comparative advantages
Before pointing out the results of the tests, let us mention that the conclusions and observations which can be drawn, will probably not apply in the next few years. Indeed, the changes experienced by French cooperative banking groups are still recent ; some of the external concentration operations have been expensive for them, and the plc banks they have bought on the markets are not often among the more efficient (for example, the Credit Lyonnais, which has been bought by Credit Agricole group). internal restructuring (mergers, creation of IT platforms, of standardized information, reporting and risk management systems…) is also costly, and the return on investment is not immediate.
At this stage, French cooperative banking groups appear more efficient than French plc banking groups in credit risk management, if we consider the ratio *loan loss provision / net interest revenue,* but this is not true if we consider the *loan loss reserve/ impaired loans* ratio. The net interest margin, compared with the assets, seems to be equal for cooperative groups and for plc groups in France.
Nevertheless, if we compare these last two ratios for the FcopB and for the FcopBG, it appears that French cooperative groups are less efficient than the cooperative networks themselves.
Considering operational efficiency, the tests show that *personnel expenses* are relatively lower in cooperative groups than in cooperative banks, but are still higher than in French plc banking groups. Because of a *pre tax operating income / total assets* ratio lower in cooperative banking groups than in cooperative networks, the consequence is that the *cost to income ratio* can be considered as equal in the FcopB, in the FcopBG, and in the FplcBG.
Seeing the equity capital ratios, the consequences of the transformation of cooperative banks into universal banking groups are clear : cooperative groups benefit from a higher capital ratio *(equity / total assets)* than plc groups, thanks to the magnitude of this ratio in the cooperative network, since this ratio is higher for the FcopB than for the FcopBG. This comment is supported by the fact that the use of subordinated debt is bigger at the level of the cooperative group than it is at the level of the cooperative network. So, we can conclude that the transformation of cooperative banks into cooperative groups still allows a comparative advantage for these groups, when compared with the other plc French banking groups, but does not result in improving the capital ratio. In fact, it allows cooperative groups to benefit from their cooperative status, which brings a lot of reserve, and at the same time to benefit from the presence of plc banks in the group, allowing capital to be raised on the financial market.
If we focus on the financial efficiency indicators, we can conclude that until now, the *RoE* ratio is still in favour of the FplcBG, not higher in the FcopB than in the FcopBG ; that the *return on average assets* appears higher in cooperative banks than in plc groups, and, more surprisingly, higher in plc groups than in cooperative groups. Nevertheless, we can see from the graph in appendix 6 that the *RoE* of cooperative groups tends to improve and to surpass (be higher/bigger/better than?) that of cooperative networks at the end of the period. It remains that at this stage, the strategy of growth of cooperative banks, and the move towards

huge groups have not brought the same returns, especially for the shareholders of these groups, as those of French plc banking groups.

Higher efficiency for European plc banks than for French banks ?

Considering the risk management ratios, European plc banking groups (EplcBG) do not seem to be more efficient than French cooperative banks (FcopB) : all of the tests point to the equality of the ratios observed

. But some ratios tend to prove that they are more efficient than French plc banking groups *(loan loss provision/net interest revenues)* or than French cooperative banking groups *(loan loss reserve / impaired loans)*. The commercial performance ratio *(net interest revenue/ average assets)* tends to confirm this hypothesis, and shows that the effective risk is properly hedged by the rates applied to the customers in EplcBG.

The operational efficiency ratios denote that, despite the same level of personnel expenses in EplcBG than in FplcBG, the pre tax operating income is higher for the former than for French plc or cooperative banking groups. Only French cooperative banks equal this ratio. Even so, European plc banks show a lower *cost to income ratio* than French cooperative banks, cooperative and plc banking groups.

If the tests show that French cooperative banks keep a comparative advantage in the equity capital ratio, this is not the case of French plc groups.

Last, the good level of operational, commercial and risk management efficiency explains the financial performance of the EplcBG : the *RoE* is higher than for all the three groups of French banks[8], and the *Return on average assets* is equal to the FcopB, and higher than that of FcopBG and FplcBG.

[8] Only at a 10% risk level, if we consider the EplcBG versus the FplcBG

Table 1 : interpretation of Wilcoxon tests results

Reading guide : **FcopB** : French coop. Banks (or networks) ; **FcopBG** : French coop. Banking groups ; **EplcBG** : European plc banking groups ; **FplcBG** : French plc banking groups.

The " = " sign denotes the acceptance of the H(0) equal efficiency ; ">" means that the H(0) hypothesis is rejected to the benefit of the H(1) hypothesis, and points to a higher efficiency ratio for the sub-group of banks on the left-hand side

	available data period	Wilcoxon Test Criterion : W+	Critical value (5%risk level)	Rejection of the H(0) equality efficiency	Results
Risk and commercial efficiency ratios					
Loan loss provision/ net interest revenue	1997-2004	27	31	No	FcopB=FcopBG
	1995-2004	45	45	Yes	EplcBG>FplcBG
	1995-2004	46	45	Yes	FcopB>FplcBG
	1997-2004	33	31	Yes	FcopBG>FplcBG
	1995-2004	17	45	No	FcopB=EplcBG
	1997-2004	27	31	No	FcopBG=EplcBG
Net interest revenues / average assets	1997-2004	35	31	Yes	FcopB>FcopBG
	1995-2004	55	45	Yes	EplcBG>FplcBG
	1995-2004	52	45	Yes	FcopB>FplcBG
	1997-2004	16	31	No	FcopBG=FplcBG
	1995-2004	38	45	No	FcopB=EplcBG
	1997-2004	36	31	Yes	EplcBG>FcopBG
Loan loss reserve/ impaired loans	1997-2004	34	31	Yes	FcopB>FcopBG
	1995-2004	36	45	No	EplcBG=FplcBG
	1995-2004	40	45	No	FcopB=FplcBG
	1997-2004	55	31	Yes	FplcBG>FcopBG
	1995-2004	34	45	No	FcopB=EplcBG
	1997-2004	36	31	Yes	EplcBG>FcopBG

Capital Equity ratios					
Equity/total assets	1997-2004	36	31	Yes	FcopB>FcopBG
	1995-2004	55	45	Yes	EplcBG>FplcBG
	1995-2004	55	45	Yes	FcopB>FplcBG
	1997-2004	36	31	Yes	FcopBG>FplcBG
	1995-2004	55	45	Yes	FcopB>EplcBG
	1997-2004	27	31	No	FcopBG=EplcBG
Subordinated debt/ capital funds					
	1997-2004	36	31	Yes	FcopB>FcopBG
	1995-2004	21	45	No	EplcBG=FplcBG
	1995-2004	55	45	Yes	FcopB>FplcBG
	1997-2004	36	31	Yes	FcopBG>FplcBG
	1995-2004	55	45	Yes	FcopB>EplcBG
	1997-2004	36	31	Yes	FcopBG>EplcBG
Operational efficiency ratios					
Pre-tax operating income/ average assets	1997-2004	35	31	Yes	FcopB>FcopBG
	1995-2004	50	45	Yes	EplcBG>FplcBG
	1995-2004	55	45	Yes	FcopB>FplcBG
	1997-2004	29	31	No	FcopBG=FplcBG
	1995-2004	31	45	No	FcopB=EplcBG
	1997-2004	36	31	Yes	EplcBG>FcopBG
Cost to income ratio	1997-2004	19	31	No	FcopB=FcopBG
	1995-2004	52	45	Yes	EplcBG>FplcBG
	1995-2004	42	45	No	FcopB=FplcBG
	1997-2004	15	31	No	FcopBG=FplcBG
	1995-2004	45	45	Yes	EplcBG>FcopB
	1997-2004	33	31	Yes	EplcBG>FcopBG

Personnel expenses/ total assets	1997-2004	36	31	Yes	FcopBG>FcopB
	1995-2004	42	45	No	EplcBG=FplcBG
	1995-2004	50	45	Yes	FplcBG>FcopB
	1997-2004	35	31	Yes	FplcBG>FcopBG
	1995-2004	47	45	Yes	EplcBG>FcopB
	1997-2004	36	31	Yes	FcopBG>EplcBG
Financial Efficiency ratios					
Return on equity	1997-2004	13	31	No	FcopB=FcopBG
	1995-2004	42	45	No	EplcBG=FplcBG
	1995-2004	46	45	Yes	FplcBG>FcopB
	1997-2004	34	31	Yes	FplcBG>FcopBG
	1995-2004	53	45	Yes	EplcBG>FcopB
	1997-2004	36	31	Yes	EplcBG>FcopBG
Return on average assets	1997-2004	36	31	Yes	FcopB>FcopBG
	1995-2004	45	45	Yes	EplcBG>FplcBG
	1995-2004	54	45	Yes	FcopB>FplcBG
	1997-2004	31	31	Yes	FplcBG>FcopBG
	1995-2004	24	45	No	FcopB=EplcBG
	1997-2004	36	31	Yes	EplcBG>FcopBG

To sum up, the statistical approach allows us to deny the arguments of the American authors listed above : the cooperative status is not a barrier in itself : in the French context, despite higher personnel expenses, cooperative banks have generally appeared more efficient than plc banks over the last decade, except for the *RoE* ratio, which is not the only objective of a cooperative, and which cannot be interpreted by itself as weak performance. If their evolution towards cooperative groups allows them to compete in the same activities as French plc banking groups, it remains that most of the efficiency ratios of these groups and of plc groups are lower than the efficiency ratios of European plc banks. As a rule, only the efficiency indicators of French cooperative banks compare favourably with these European plc banks.

3. Common features and differences in efficiency indicators of some European cooperative banks : a factor analysis approach

In this part, we will try to broaden the analysis to a European level. Our purpose is to compare the different cooperative banks themselves, and then compare them with a European

sample of commercial banks, and finally point out some common features and differences. Indeed, the organization and the structure of cooperative banks might be different in different European countries : some of them are not organized as a network, some cooperative networks have two or three levels (local, regional, national). Some cooperative banks can be independent, and are not necessarily affiliated to a central bank, some of them can be listed or have a listed vehicle in their banking group. We also want to check if the efficiency characteristics we have pointed out for French cooperative banks are similar in other European countries. Therefore, we have conducted a factor analysis (principal component analysis), relying on the same efficiency ratios[9] than those described above.

Actually, the same efficiency ratios have been downloaded from the Bankscope data base, on an aggregate level basis, for each country : thus, each efficiency ratio we are working with is the mean of the ratios observed for each cooperative bank or network of the country, weighted by the amount of assets of the banks.

Then, for the different cooperative banks, the countries' data included in the study are the following :

- Germany : Volksbanken and Raiffeeisenbanken networks
- Netherlands : Rabobank
- Finland : OP group
- Italy : Banche di Credito Cooperativo and Banche Popolare
- United Kingdom : building societies
- Spain : Cajas Rurales network
- Austria : Volksbanken and Raiffensenbanken
- France : Caisse d'Epargne, Credit Mutuel, Credit Agricole, Credit Cooperatif, Banques Populaires networks

The data used for the European sample of *plc banking groups* are the same than those used in part 2 (and described in Appendix 4). At this stage of the study, a factor analysis was implemented in 2004, using the software SPAD.

A description of the factor analysis :

All the individuals (the banks in the countries listed above) have been saved for the analysis. The two Italian banking networks (Credito Cooperativo and popolare) have been considered as a single network[10].

Correlations between the initial variables :

- In view of the matrix of correlations and the descriptive statistics (cf. appendix 7), we can see that some of the initial variables (the efficiency ratios) seem to be correlated to one another, and that the standard error of these variables is sometimes high, which will explain that the indicators for the countries under study will be scattered on the plot (? Terme technique?). The correlations are particularly significant and positive between "equity/total assets" and "net interest revenues/average assets" (0,72), "equity/total assets" and "pre-tax operational income/total assets" (0,78), and between "net interest revenue/ average assets" and "personnel expenses/average assets" (0,84). Some other variables seem to be negatively correlated, but the intensity of the correlation is lower : "cost to income" and "pre-tax operational income/average assets" (-0,5), "cost to income" and "return on average equity" (-0,53). The sign of the correlations seems logical.

[9] Seven efficiency ratios have been included in the analysis : equity/total assets, net interest revenues /average assets, cost to income, pre-tax operational income/average assets, return on average equity, personnel costs / total assets, loan loss provision/net interest revenues

[10] In another factor analysis, these two networks have been separated, but the different ratios, and the correlations between these ratios, are quite similar, which does not make the analysis more reliable.

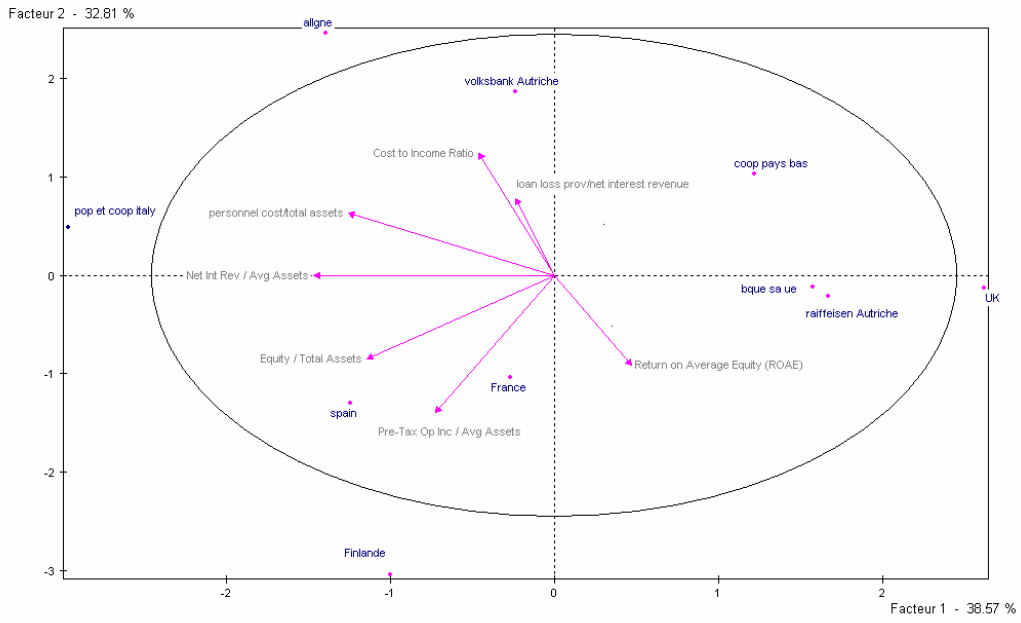
Contributions of the initial variables to the factors

- 90, 94 % of the total variance can be explained by three factors (the contribution of the third factor in explaining the total variance is 19,56%).
- The first factor is mainly explained by three variables (cf. appendix 8) : “net interest revenue/average assets”, “personnel expenses/total assets” and “equity/total assets” ; all of them are negatively correlated to the factor, which denotes that the banks which have a lot of capital equity benefit from a net interest margin, but can also show high personnel expenses. There is no opposition between these three variables.
- Two initial variables are highly correlated to the second factor : one positively (cost to income) and one negatively (pre-tax operational income/ average assets). Two other variables are moderately and negatively correlated to this factor : “equity/total assets” and “return on equity”. Thus, this factor seems to express operational efficiency, and its link with the financial efficiency results.
- The variables “return on equity” and “loan loss provision/net interest revenue” are highly and negatively correlated to the third factor. This factor seems to express the risk behaviour of the banks, and the impact on the financial return.

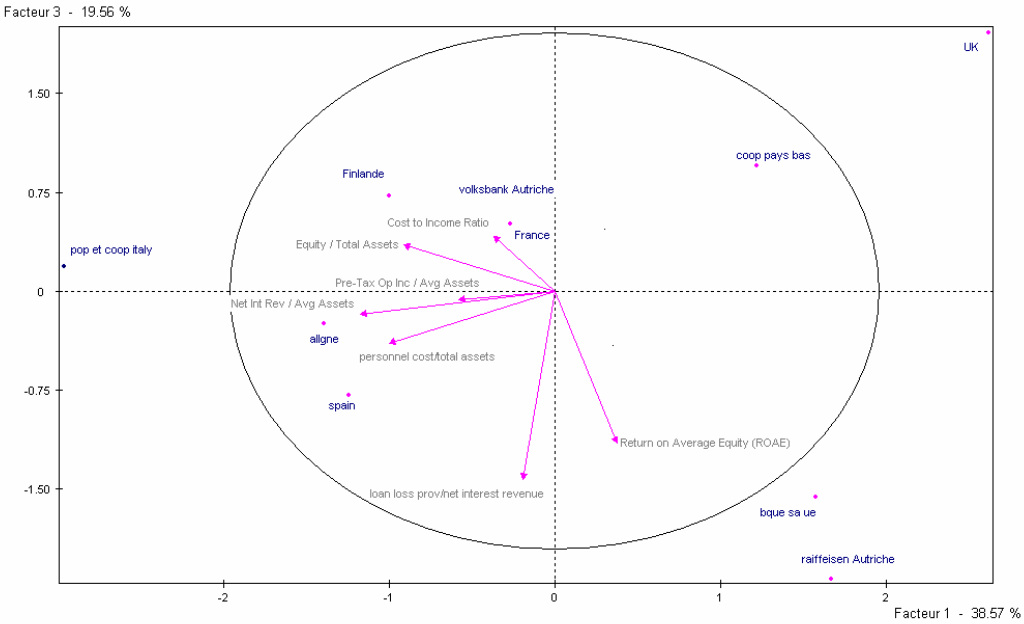
Contributions of the individuals to each factor :

- The first factor is mainly explained by UK building societies and the two Italian cooperative banking networks (cf. appendix 8), whose representation is opposed on the plot (see graph 2 below).
- The information given by the second factor actually comes from three individuals : the Finnish cooperative banks, the German ones, and the Austrian Volksbanken. The Finnish banks are opposed to the German and Austrian banks on the plot, which denotes different results in the efficiency ratios explaining this factor (see graph 2)
- Three other individuals explain most of the information given by the third factor : European plc banks, UK building societies and Austrian Raiffesenbanken. The latter are opposed to the former on the plot (see graph 3).

Graph 1 : Initial variables, individuals and contribution to the 1rst and 2nd factors



Graph 2 : Initial variables, individuals and contribution to the 2nd and 3rd factors



What do we learn from the factor analysis ?

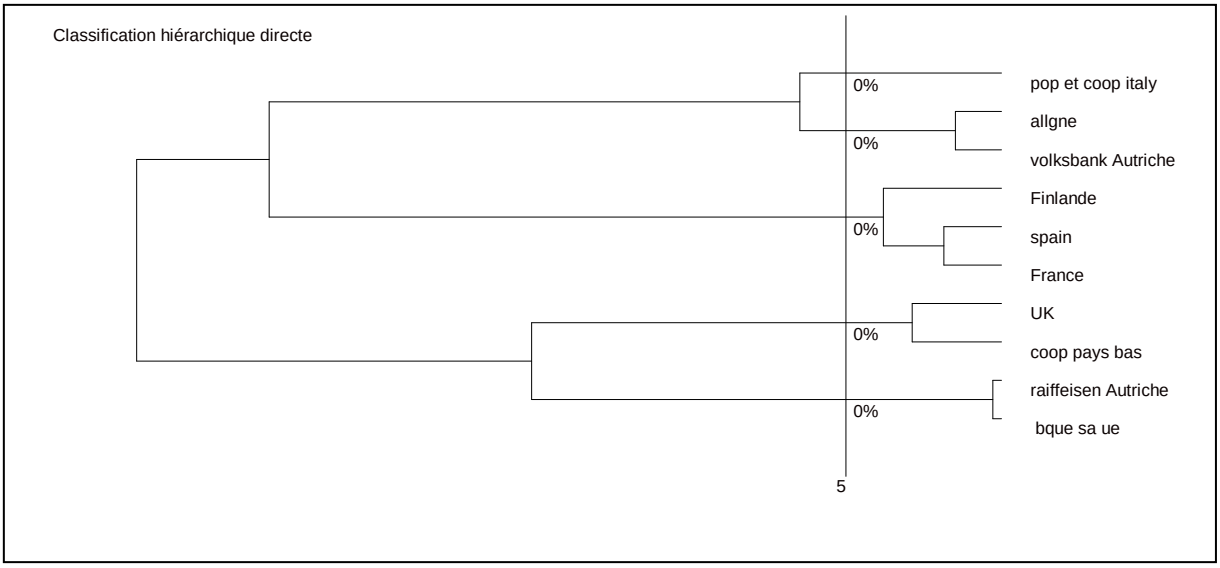
When we analyse the meaning of the first factor we can notice that Italian cooperative banks seem to be quite apart, and more generally, that Italian, Spanish and German cooperative banks are opposed to t European plc banks Austrian Raiffeisenbanken and also Dutch coop. banks. Unlike the latter, the former are characterized by the magnitude of net interest revenues, of equity capital (Spain), but also by higher personnel expenses (Italy, Germany).

As regards the position of the individuals, in relation with the second factor, we can say that there is an obvious opposition between the Finnish coop. banks, the Spanish and the French ones on one side, and on the other side, the German, Dutch coop., and the Austrian Volksbanken. The former (especially for Finland) show a high operational efficiency (with low cost to income ratio, high pre-tax operating income) and at the same time, a high equity/assets ratio. The individuals located near the top of the plot show bad operational efficiency indicators.

The third factor explains the risk behaviour of the banks : the same sign of the correlation between the factor and the most influential variables (return on equity and loan loss provision/net interest revenue) could denote the fact that some banks develop a more risky activity (and more losses) to be able to have a high return : this, apparently, is the case for European plc banking groups and, more surprisingly, for Austrian Raiffeisenbanken, as opposed to UK building societies, or Dutch coop. banks, for example.

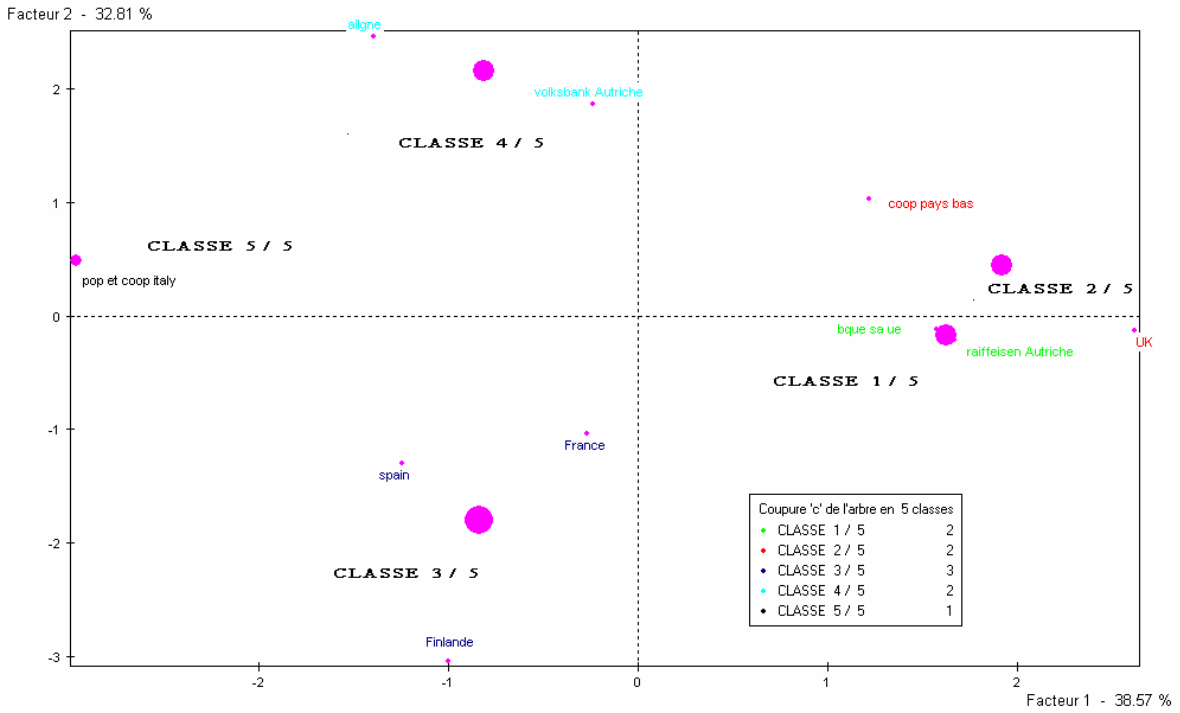
In view of the “classification tree diagram” below, five separated classes have been built :

1 : European plc banking groups ; Austrian Raiffeisenbanken
2 : Dutch cooperative banks ; UK building societies
3 : French, Spanish and Finnish cooperative banks
4 : German Volksabanken and Raiffeisenbanken ; Autrian Raiffeisenbanken
5 : Cooperative and popular Italian banks

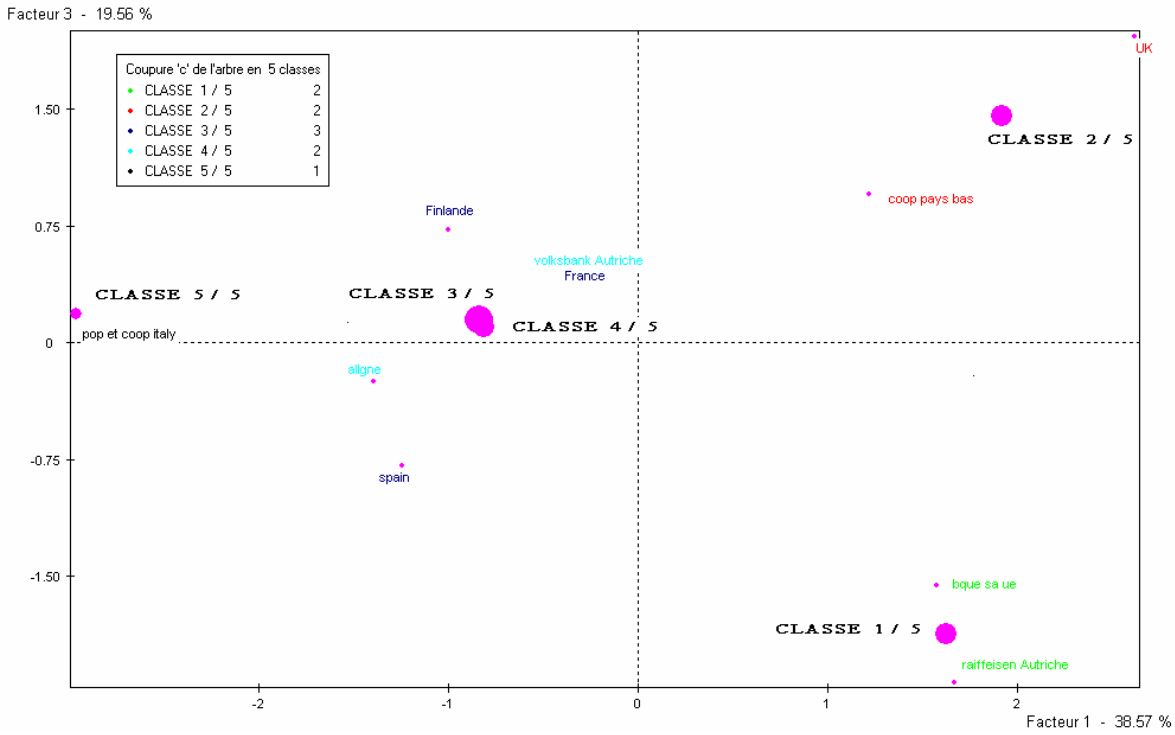


The representation of these five categories (see graphs 3 and 4 below) on the plot confirms our preceding comments : diversity in the situation and the efficiency of cooperative banks in Europe.

Graph 3 : Classes and factors 1 and 2



Graph 4 : Classes and factors 1 and 3



In conclusion, we can summarize this factor analysis, in view of the arguments of the American authors we have presented in the first part of this paper, and the detailed analysis of French banks in part 2.

First, we can say that European Plc banks do not show higher global efficiency than European cooperative banks (in 2004): the interest margin and the relative interest net revenues are lower than for most coop. banks. Their operational efficiency is moderate, compared with Spanish, Finnish and even French cooperative banks. Of course, in line with shareholder return on equity requirement, they show high financial efficiency ratios, but also higher risk activity ratios than European cooperatives (except Raiffeisenbanken).

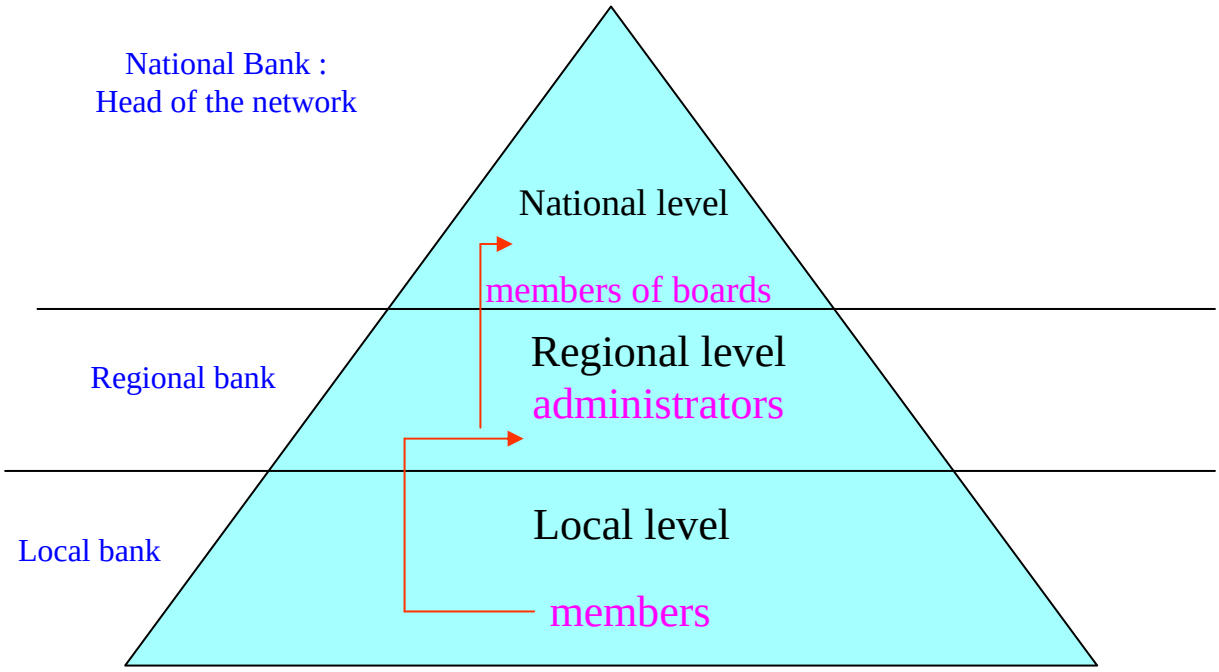
Second, the fact is that European Cooperative banks seem to behave quite differently : the third class (that is to say, Finnish, Spanish and French coop. banks) seem to be the ones with the highest global efficiency : good operational efficiency indicators, tariffs and net margin interest in line with risk behaviour, and a large equity capital. Italian cooperative banks (class 5), despite good net interest margins and the magnitude of their equity (which allows a low financing cost) are penalized by high personnel expenses, which impact the "cost to income" ratio. UK building societies and Dutch coop. banks seem to be characterized by lower operational efficiency (especially because of lower operating incomes and net interest margins), but an efficient behaviour in risk taking. They do not show high financial efficiency. This indicator is better for German coop. banks and Austrian Volksbanken, but both of them suffer from a significant lack of operational efficiency, especially because of personnel expenses.

Last, we can notice that two cooperative banking networks which seem to show the highest global efficiency indicators, that is to say the Finnish and Spanish networks, have an organization which is quite different : the organization of the Finnish OP Cooperative group is close to some French coop. banking groups, with a cooperative basis, but a lot of universal banking activities developed within the subsidiaries of the group, and even a

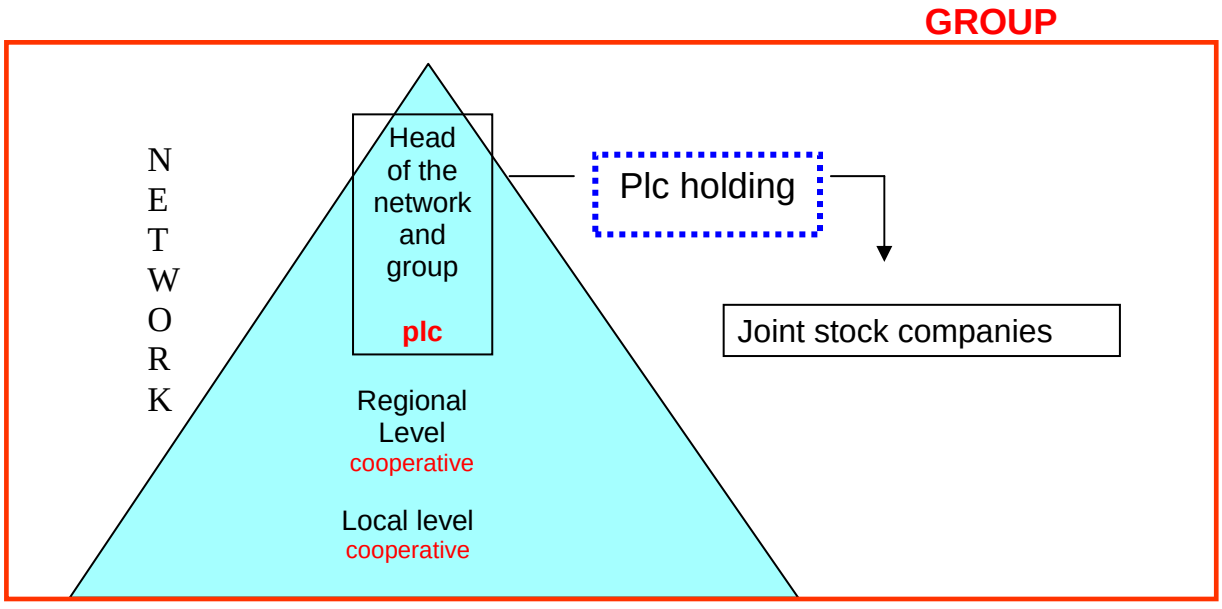
listed vehicle (OKO bank). The Spanish Cajas Rurales group is much more decentralized, with the local banks having a large degree of autonomy, a geographically limited activity, but no listed banks on the financial market. This is evidence enough that an efficient organizational model in banking activity is not unique, and not just restricted to Anglo-American plc companies!

Appendix 1 :

From the typical inverted pyramid of the cooperative network…



…. to the Cooperative Banking Group



Appendix 2

Crédit Agricole Group 31-12-2005

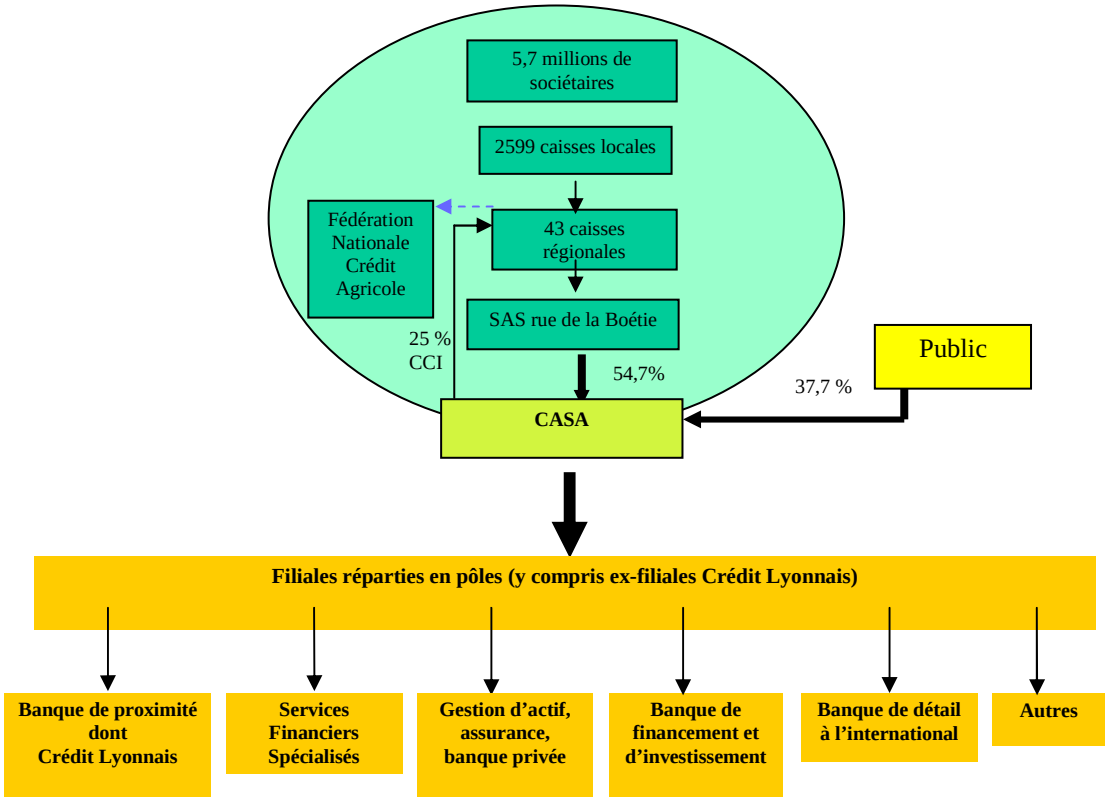
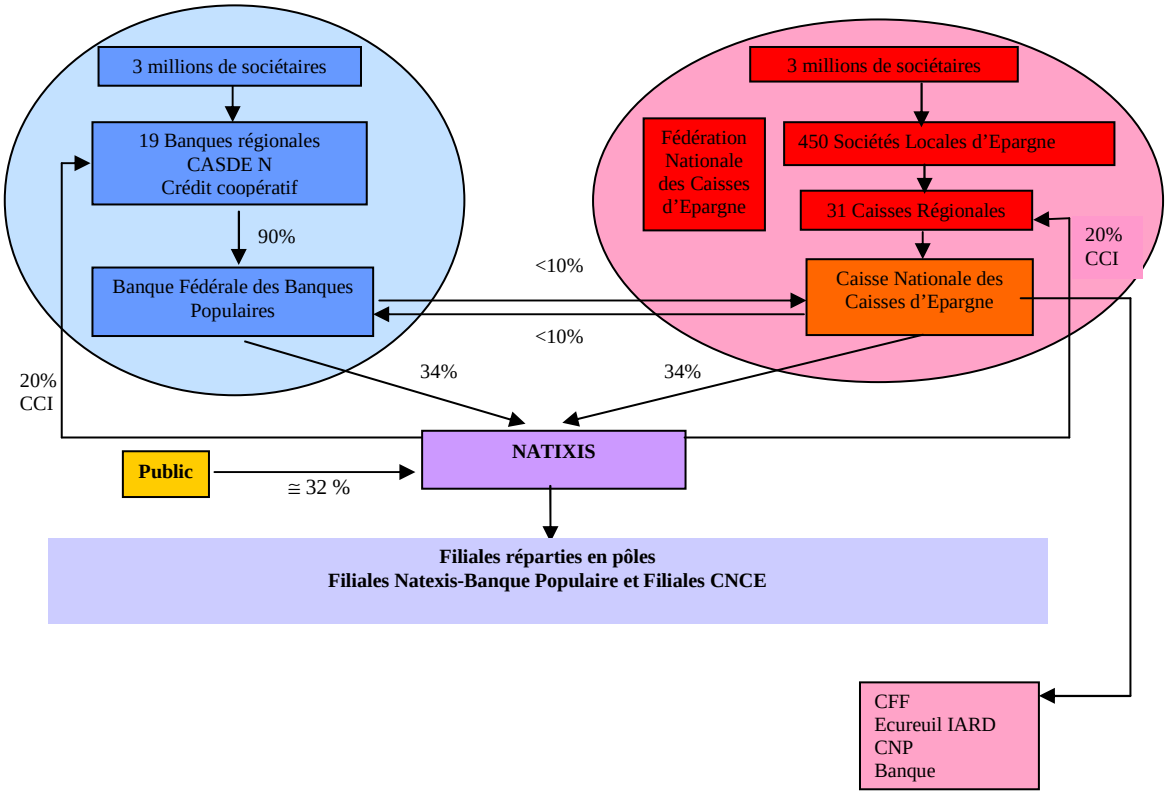
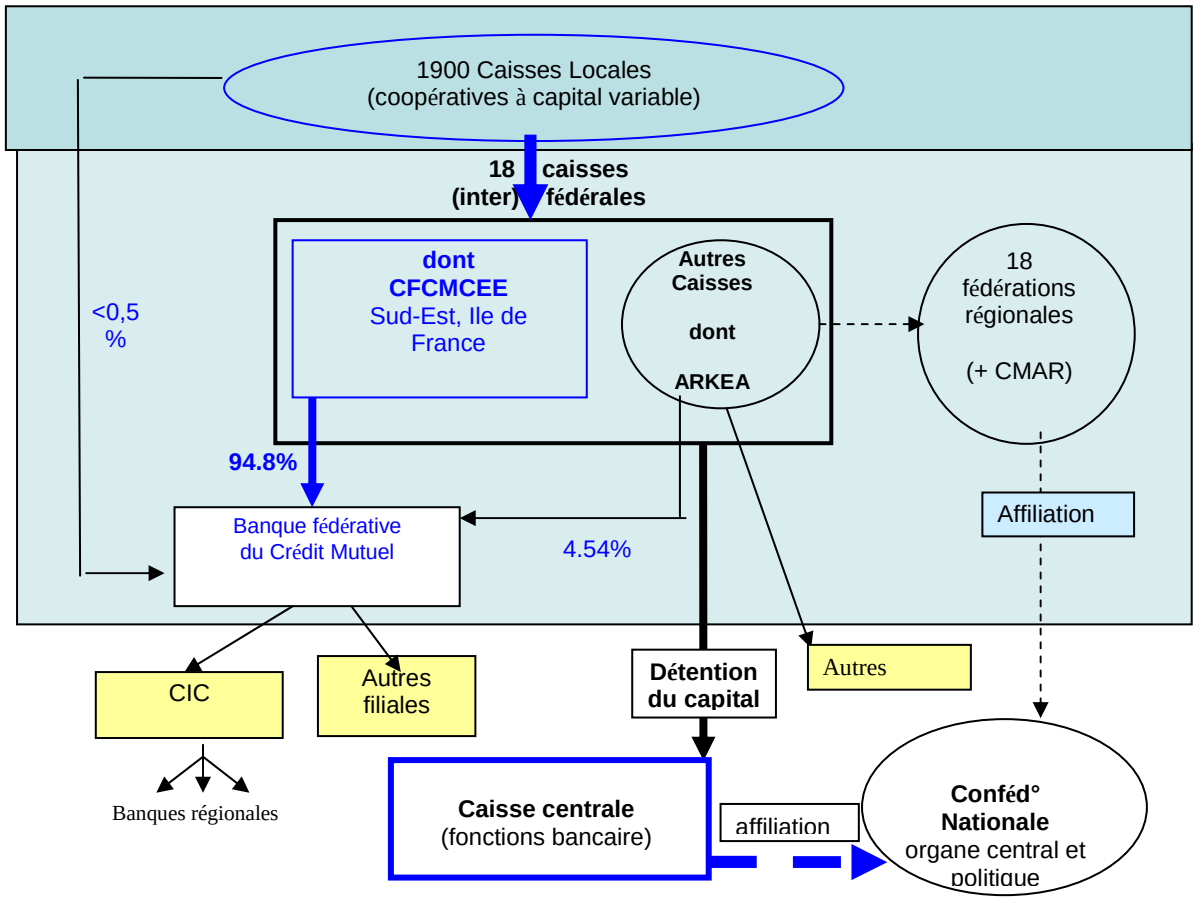


Schéma du rapprochement Banque Populaire – Caisse d'Epargne, mai 2006



Appendix 3: simplified organization chart of the Credit mutuel group



Appendix 4 :

List of the French cooperative banking networks included in the FcopB sample :

Banque Populaire
Caisse d'Epargne (since 1999 : cooperative status)
Credit Agricole
Credit Cooperatif
Credit Mutuel

List of the French cooperative banking groups included in the FcopBG sample :

Banque Populaire
Caisse d'Epargne (since 1999 : cooperative status)
Credit Agricole
Credit Cooperatif
Credit Mutuel

List of the French plc banking groups included in the FplcBG sample :

BNP-Paribas
Credit Lyonnais (until 2003)
Société Générale

List of the 34 European plc banking groups included in the EplcBG sample :

Aeral Bank AG (Germany)
ABN Amro Holding NV (Netherlands)
Allied Irish Banks plc (Ireland)
Alpha Bank AE (Greece)
Anglo Irish Bank Corporation plc (Ireland)
Gruppo Monte dei Paschi di Sienna Banca Monte dei Piaschi di Siena Spa (Italy)
Banco Bilbao Vizcaya Argentaria Sa (Spain)
Millenium bcp Banco Commercial Portugues SA (Portugal)
Banco de sabbadel SA (Spain)
Banco espanol de credito Sa (BANESTO) (Spain)
Banco espirito santo (Portugal)
Banco Popular Espanol Sa (Spain)
Banco Santander SA (Spain)
Bank Austria Creditanstalt AG (Austria)
Bank of Ireland (Ireland)
Bankinter SA (Spain)
Bayerische Hypo und Vereinsbank AG (Germany)
BNP Paribas (France)
Bradford and Bingley plc (U. Kingdom)
Capitalia spa (Italy)
Commerzbank AG (Germany)
Dankse Bank A/S (Denmark)
Defpa Bank plc (Ireland)
Deutsche Bank AG (Germany)
EFG Eurobank Ergasias SA (Greece)
Intesa SanPaolo (Italy)
Irish life & permanent plc (Ireland)
NNational Bank of Greece SA (Greece)
Northern Rock plc (U. Kingdom)
Piraeus Bank SA (Greece)
Skandinaviska Enskilda Banken AB (Sweden)
Société Générale (France)
Svenska Handelsbanken (Sweden)
Unicredito Spa (Italy)

Appendix 5 : Example of a Wilcoxon test performed on the ratio :
Net interest margin/ average assets (NIM)

	%	%			
année	**NIM FcopB**	**NIM FplcBG**	**$\Delta = NIM_{FcopB} - NIM_{FplcBG}$**	**Δ sign**	**Rank of $\lvert\Delta\rvert$**
1995	2,08	1,61	0,47	+	4
1996	1,54	1,4	0,14	+	1
1997	1,56	1,34	0,22	+	2
1998	0,98	1,24	-0,26	-	3
1999	1,9	0,79	1,11	+	10
2000	1,75	0,82	0,93	+	7
2001	1,78	0,78	1	+	8
2002	1,75	0,96	0,79	+	5
2003	1,83	0,97	0,86	+	6
2004	1,87	0,85	1,02	+	9

$W^+ = 52$

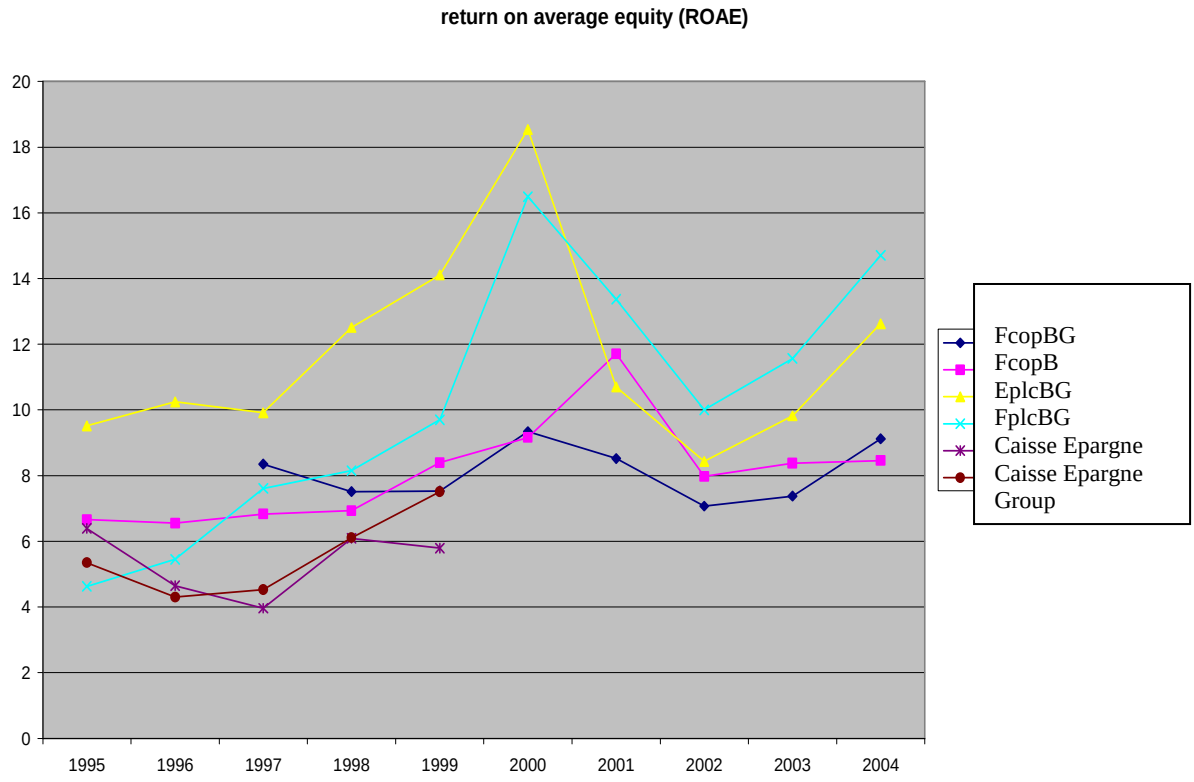
The method is the following : Every year the difference (**Δ)** of the observed ratio for French Coop. Banks (FcopB) and French plc banking groups (FplcBG) is calculated. Thus, a sample of differences, positive or negative, is available.
To each difference a rank is given (from 1 to 10, considering the period), which is ordered according to an increasing absolute value criterion. Under the null hypothesis H(0) of equal efficiency between FcopB and FplcBG, the sum of the positive ranks W^+ should approximately be the same as the sum of the negative ranks. By contrast, under the H(1) hypothesis of higher efficiency for the FcopB, W^+ will be larger than W^- .
The test criterion is the sum of the positive ranked differences, W^+ , whose distribution is written in the Wilcoxon statistical table (under H(0). Thus, for ten elements (years), the H(0) hypothesis of equal efficiency can be rejected as soon as W^+ exceeds 45 (5% risk level). The critical p-value attached to this number (45) can be read in the Wilcoxon table : 4,2%.

The result of the test, in this example is : ΣW^+ (Bco) = 54 ; 52 > 45 (critical value)

→ H(0) is rejected

conclusion : higher efficiency for the FcopB than the (FcopB > FplcBG)

Appendix 6 :


return on average equity (ROAE)
20
18
16
14
12
10
8
6
4
2
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
FcopBG
FcopB
EplcBG
FplcBG
Caisse Epargne
Caisse Epargne Group

Appendix 7 : descriptive statistics and factor analysis

ANALYSE EN COMPOSANTES PRINCIPALES
STATISTIQUES SOMMAIRES DES VARIABLES CONTINUES
EFFECTIF TOTAL : 10 POIDS TOTAL : 10.00

NUM . IDEN - LIBELLE	EFFECTIF	POIDS	MOYENNE	ECART-TYPE	MINIMUM	MAXIMUM
1 . Equi - Equity / Total Asset	10	10.00	6.91	2.26	4.22	11.05
3 . Net - Net Int Rev / Avg As	10	10.00	1.91	0.56	0.99	2.79
4 . Cost - Cost to Income Ratio	10	10.00	65.82	5.42	59.24	74.78
5 . Pre- - Pre-Tax Op Inc / Avg	10	10.00	0.77	0.27	0.50	1.36
6 . Retu - Return on Average Eq	10	10.00	9.17	2.36	5.45	13.62
7 . pers - personnel cost/total	10	10.00	1.00	0.29	0.44	1.57
8 . loan - loan loss prov/net i	10	10.00	12.42	6.73	1.13	22.12

MATRICE DES CORRELATIONS

	Equi	Net	Cost	Pre-	Retu	pers	loan
Equi	1.00						
Net	0.72	1.00					
Cost	-0.02	0.24	1.00				
Pre-	0.78	0.47	-0.50	1.00			
Retu	-0.04	-0.26	-0.53	0.37	1.00		
pers	0.30	0.84	0.42	0.10	-0.37	1.00	
loan	-0.28	0.25	0.19	-0.32	0.25	0.49	1.00

MATRICE DES VALEURS-TESTS

	Equi	Net	Cost	Pre-	Retu	pers	loan
Equi	99.99						
Net	2.87	99.99					
Cost	-0.07	0.76	99.99				
Pre-	3.32	1.59	-1.72	99.99			
Retu	-0.11	-0.85	-1.86	1.24	99.99		
pers	0.99	3.82	1.41	0.33	-1.21	99.99	
loan	-0.90	0.81	0.61	-1.06	0.82	1.70	99.99

VALEURS PROPRES
APERCU DE LA PRECISION DES CALCULS : TRACE AVANT DIAGONALISATION .. 7.0000
SOMME DES VALEURS PROPRES 7.0000
HISTOGRAMME DES 7 PREMIERES VALEURS PROPRES

NUMERO	VALEUR PROPRE	POURCENTAGE	POURCENTAGE CUMULE	
1	2.7000	38.57	38.57	**********
2	2.2965	32.81	71.38	*********
3	1.3694	19.56	90.94	*****
4	0.4472	6.39	97.33	**
5	0.1533	2.19	99.52	*
6	0.0252	0.36	99.88	*
7	0.0084	0.12	100.00	*

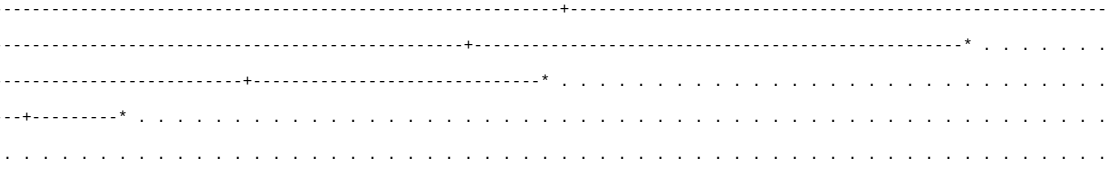
ATTENTION (EDCAT-800)
LES VALEURS DE TEST DIF3 SONT POSITIVES.
RECHERCHE DE PALIERS ENTRE (DIFFERENCES SECONDES)

PALIER ENTRE	VALEUR DU PALIER	
3 -- 4	628.33	**********
2 -- 3	4.88	*

INTERVALLES LAPLACIENS D'ANDERSON
INTERVALLES AU SEUIL 0.95

NUMERO	BORNE INFERIEURE	VALEUR PROPRE	BORNE SUPERIEURE
1	0.2053	2.7000	5.1946
2	0.1746	2.2965	4.4183
3	0.1041	1.3694	2.6347
4	0.0340	0.4472	0.8604
5	0.0117	0.1533	0.2950

ETENDUE ET POSITION RELATIVE DES INTERVALLES



Appendix 8 : Output of the factor analysis

COORDONNEES DES VARIABLES SUR LES AXES 1 A 5
VARIABLES ACTIVES

VARIABLES	COORDONNEES					CORRELATIONS VARIABLE-FACTEUR					ANCIENS AXES UNITAIRES				
IDEN - LIBELLE COURT	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Equi - Equity / Total Asset	-0.76	-0.53	0.21	0.23	-0.19	-0.76	-0.53	0.21	0.23	-0.19	-0.46	-0.35	0.18	0.34	-0.50
Net - Net Int Rev / Avg As	-0.98	0.00	-0.10	-0.07	-0.08	-0.98	0.00	-0.10	-0.07	-0.08	-0.60	0.00	-0.09	-0.10	-0.20
Cost - Cost to Income Ratio	-0.31	0.76	0.25	0.50	0.10	-0.31	0.76	0.25	0.50	0.10	-0.19	0.50	0.21	0.75	0.25
Pre- - Pre-Tax Op Inc / Avg	-0.48	-0.86	-0.04	0.01	0.16	-0.48	-0.86	-0.04	0.01	0.16	-0.29	-0.57	-0.03	0.01	0.41
Retu - Return on Average Eq	0.31	-0.56	-0.69	0.32	0.09	0.31	-0.56	-0.69	0.32	0.09	0.19	-0.37	-0.59	0.48	0.24
pers - personnel cost/total	-0.84	0.39	-0.24	-0.20	0.21	-0.84	0.39	-0.24	-0.20	0.21	-0.51	0.26	-0.20	-0.30	0.53
loan - loan loss prov/net i	-0.16	0.48	-0.85	0.01	-0.15	-0.16	0.48	-0.85	0.01	-0.15	-0.10	0.32	-0.73	0.01	-0.38

COORDONNEES, CONTRIBUTIONS ET COSINUS CARRES DES INDIVIDUS
AXES 1 A 5

INDIVIDUS			COORDONNEES					CONTRIBUTIONS					COSINUS CARRES				
IDENTIFICATEUR	P.REL	DISTO	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
bque sa ue	10.00	5.20	1.58	-0.12	-1.56	-0.01	0.52	9.2	0.1	17.7	0.0	17.3	0.48	0.00	0.47	0.00	0.05
spain	10.00	4.74	-1.24	-1.30	-0.79	-0.64	-0.65	5.7	7.3	4.6	9.3	27.4	0.32	0.36	0.13	0.09	0.09
UK	10.00	10.95	2.62	-0.13	1.96	-0.15	-0.44	25.4	0.1	28.2	0.5	12.6	0.63	0.00	0.35	0.00	0.02
coop pays bas	10.00	3.64	1.22	1.03	0.95	0.34	0.25	5.5	4.6	6.6	2.6	4.1	0.41	0.29	0.25	0.03	0.02
pop et coop italy	10.00	10.55	-2.96	0.49	0.19	1.19	-0.20	32.5	1.1	0.3	31.7	2.5	0.83	0.02	0.00	0.13	0.00
allgne	10.00	9.86	-1.39	2.46	-0.25	-1.33	0.22	7.1	26.3	0.5	39.7	3.0	0.20	0.61	0.01	0.18	0.00
volksbank Autriche	10.00	4.14	-0.23	1.87	0.45	0.55	0.10	0.2	15.2	1.5	6.7	0.6	0.01	0.84	0.05	0.07	0.00
raiffeisen Autriche	10.00	7.96	1.67	-0.21	-2.19	0.51	-0.27	10.4	0.2	35.0	5.8	4.6	0.35	0.01	0.60	0.03	0.01
Finlande	10.00	11.23	-1.00	-3.05	0.72	-0.05	0.63	3.7	40.5	3.8	0.1	26.2	0.09	0.83	0.05	0.00	0.04
France	10.00	1.72	-0.26	-1.04	0.51	-0.40	-0.16	0.3	4.7	1.9	3.6	1.7	0.04	0.63	0.15	0.09	0.02

COORDONNEES ET VALEURS-TEST DES MODALITES
AXES 1 A 5

MODALITES			VALEURS-TEST					COORDONNEES					
IDEN - LIBELLE	EFF.	P.ABS	1	2	3	4	5	1	2	3	4	5	DISTO.
9 . coté en bourse													
Mod1 - Mod1	4	4.00	0.5	0.8	1.0	-1.6	-1.0	0.30	0.52	0.47	-0.45	-0.16	0.80
Mod2 - Mod2	5	5.00	0.6	-1.0	-1.1	0.5	1.3	0.35	-0.51	-0.41	0.12	0.16	0.60

CLASSIFICATION HIERARCHIQUE (VOISINS RECIPROQUES)
SUR LES 3 PREMIERS AXES FACTORIELS
DESCRIPTION DES NOEUDS

NUM.	AINE	BENJ	EFF.	POIDS	INDICE	HISTOGRAMME DES INDICES DE NIVEAU
11	8	1	2	2.00	0.02074	*
12	6	7	2	2.00	0.10887	*****
13	2	10	2	2.00	0.13553	******
14	3	4	2	2.00	0.21508	*********
15	9	13	3	3.00	0.28966	**********
16	5	12	3	3.00	0.49534	********************
17	14	11	4	4.00	1.15664	**********
18	16	15	6	6.00	1.80783	**********
19	18	17	10	10.00	2.13619	**********

SOMME DES INDICES DE NIVEAU = 6.36588
NOUVEL ORDRE DES INDIVIDUS : NOUVEAU, NUMERO ET IDENTIFICATEURD'ORIGINE.

1	2	3	4	5	6	7	8	9	10
bqu	raif	coop	UK	Fran	spai	Finl	volk	allg	pop

DESCRIPTION DES NOEUDS DE LA HIERACHIE
(INDICES EN POURCENTAGE DE LA SOMME DES INDICES : 6.36588)

NOEUD		SUCCESSEURS				COMPOSITION	
NUMERO	INDICE	AINE	BENJ	EFFECT.	POIDS	PREMIER	DERNIER
11	0.33	2	1	2	2.00	1	2
12	1.71	9	8	2	2.00	8	9
13	2.13	6	5	2	2.00	5	6
14	3.38	4	3	2	2.00	3	4
15	4.55	7	13	3	3.00	5	7
16	7.78	10	12	3	3.00	8	10
17	18.17	14	11	4	4.00	1	4
18	28.40	16	15	6	6.00	5	10
19	33.56	18	17	10	10.00	1	10

DENDROGRAMME

RANG	IND.	IDEN	DENDROGRAMME (INDICES EN POURCENTAGE, DE LA SOMME DES INDICES : 6.36588 MIN = 0.33% / MAX = 33.56%)
1	0.33	bqu	--+
2	18.17	raif	--*----------
3	3.38	coop	----------+
4	33.56	UK	----------*----------*----------
5	2.13	Fran	-------+
6	4.55	spai	-------*-------+
7	28.40	Finl	---------------*----------
8	1.71	volk	------+
9	7.78	allg	------*----------+
10	-----	pop	--------------------------*----------

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